
APPENDIX G

Standards

Background

- G.1 One of the remarkable achievements of the global telephony system is that anyone with a telephone can call anyone else in the world with a telephone. This achievement comes about because of the interconnection of hundreds of autonomously operated telephone networks around the world. This global interconnection of telephone networks has only been made possible through technical standards that have been agreed internationally and committed to by almost all countries.
- G.2 In the past, and largely for historical reasons, within countries there has tended to be a single telephone network operation, a monopoly usually owned by the government of that country. This operation was usually also empowered with administering telecommunications nationally. It would set technical national standards, represent the country at international standards forums and otherwise administer telecommunications internationally. This has tended to result in the development of international technical standards which have focused on:
- standards applying within a network (i.e., primarily to enable the interoperation of different equipment vendors)
 - standards applying to customer premises equipment (i.e., to ensure the satisfactory operation of telecommunications end-to-end)
 - standards applying to the international connection of national telephone networks
- G.3 The interconnection of separately operated telephone networks within the same country has not, and continues not to be, addressed at international standards forums. This is mainly because such forums tend to be dominated by "traditional" administrators who have little interest in, or in some cases actively oppose, progressing such standards.
- G.4 Telecommunications services and features available within a national telephony network tend to be much richer than the services and features available internationally between countries. International standards for the interconnection of national networks tend to be featureless, supporting little more than basic call set up and release.
- G.5 Most telephone networks are capable of supporting many services over and above basic call connections. For example:
- call forwarding (call diversion)
 - calling line (number) presentation

- freephone (0800) calling
- closed user groups (virtual private networking)
- centrex (central exchange service)
- Integrated Service Digital Network (ISDN)
- local number portability
- Personal Communication Services (PCS)

G.6 In general, for such services to interoperate seamlessly between networks (interoperation is a fundamental concept in a network of networks) there must be appropriate functionality and information flow to be supported within and over the interconnection between the networks.

G.7 A telecommunications network can be partitioned into different functional levels. These functional levels include:

- management (network and service management)
- databases (holding customer and service information)
- service logic (actual software for supporting services)
- switching (provides the basic capabilities for switching and transmission)

G.8 Basic call set up and release and some of the less complex services such as call forwarding and calling line (number) presentation require information flow at only the switching functional level. It is at this level where much of the international standards effort has concentrated, and hence these standards tend to be reasonably well developed, albeit usually with many options. However, the more complex services, such as virtual private networking and number portability, require information flows at all four functional levels. Standards at the management, database and service logic levels tend to be considerably less well developed, and hence many networks have implemented proprietary or at least partly proprietary solutions at these levels.

G.9 The support of the interoperation of services (particularly the more complex services) between networks results in a set of requirements which have not in general been addressed by standards. The standardisation of such requirements is not seen as being particularly necessary when such services are implemented within a single network, and hence have not been actively progressed. Requirements which tend to be unique to the interoperation of services between networks (i.e., network of networks) include:

- the seamless interoperation of services between networks
- mediation functions required to maintain each network's integrity

- the requirement to interconnect and interoperate networks at "higher" (i.e., management, database and service logic) functional levels, over and above the basic switching functional level

G.10 To consolidate the above, consider an example of the interoperation of a service between two networks, which is not presently possible in New Zealand today but would likely be of considerable benefit to customers. Consider a business which has wireline telephones (connected to a private branch exchange (PBX)) and which also has mobile phones. The PBX is connected to one network operator and the mobile telephones are connected to a different network operator. The business may have a desire to include the mobile telephones into the PBX extension numbering plan (that is, from the mobile phone, a four digit extension number is dialled to call a PBX wireline phone and the mobile phone can be called by dialling a four digit extension from the PBX wireline phone). For this service to operate between the two networks, there must be common management of the extension number databases in the two networks and information flow between the service logic functional levels in each network. Complete standards for achieving this are not presently available. However, a mixture of proprietary and existing standards could be developed to allow such interoperation to be realised in New Zealand relatively quickly.

Existing interconnection specifications

- G.11 Telecom has by far the largest network in terms of the number of customers connected to it. New entrant network operators have little option but to directly interconnect with Telecom. Telecom only allows interconnection in accordance with its own specifications. Telecom has developed four specifications which cover interconnection of networks, these are:
- PTC 300 General requirements for network interconnection
 - PTC 301 Telephone network interconnection by means of the R2MFC (multichannel frequency compelled) channel associated system
 - PTC 331 Telephone network interconnection using Signalling System No. 7
 - PTC 332 Local network interconnection (draft)
- G.12 These specifications are based on the ITU-TS (International Telecommunications Union - Telecommunication Sector) recommendations. The Telecom set of interconnection specifications are entirely limited to the switching functional level and support basic call set up and release functionality. Until recently, no end-user services other than basic call set up and release functionality were supported in the specifications. A recent amendment by Telecom to the specifications now fully supports call forwarding. It is noteworthy that call forwarding has been fully defined in the ITU-TS recommendations since 1988 but only now included in the Telecom specifications.

Limitations with the existing situation

- G.13 The limitations with the existing interconnection specification situation in New Zealand can be summarised as follows:
- the specifications are controlled by Telecom, with little opportunity for influence by the industry
 - where additional functionality is desired, this must be negotiated with Telecom with no guarantee of success. Bilateral negotiation tends to be time consuming, inefficient, costly and likely to result in interconnection specification variations
 - the Telecom specifications are not a national standard acknowledged by the industry. This lack of a recognised national standard has discouraged some telecommunication equipment vendors from offering equipment to the New Zealand market
 - Telecom is reluctant to incorporate functionality on which the ITU-TS has yet to complete work, or to recognise any standard other than the ITU-TS recommendations. This stance is frustrating innovation
 - when functionality is added to the Telecom specifications, its timeliness is inadequate (e.g., the seven-year delay in supporting call forwarding functionality at the interconnection)
- G.14 Telecom controls the content of the interconnection specifications. It makes amendments to the specifications from time to time. Although seeking industry comments, experience has demonstrated that Telecom rarely acts upon the comments received. Amendments to the specifications may:
- clarify the existing description
 - update the content in line with recent developments in the ITU-TS recommendations
 - add functionality
 - remove functionality
- G.15 The most recent amendment was contained in Telecom Access Standards Newsletter No. 81, May/June 1994. In this amendment, Telecom removed functionality termed "Information Request" functionality from the specification, ignoring objections by the industry.
- G.16 As part of the same set of amendments, Telecom reduced the maximum message occupancy of signalling links from 20% (the ITU-TS recommendation) to 10% because of technical limitations within Telecom's network. This amendment will put BellSouth and the industry to significant expense because twice as many signalling links must be

provisioned at the interconnection with Telecom than would be the case if the ITU-TS recommendations were followed. This amendment applied immediately and without any commitment by Telecom to eventually return to the ITU-TS signalling link occupancy recommendations. This is an example of how Telecom deviates from international standards when it is of advantage to it to do so.

- G.17 Where additional functionality to that contained in the Telecom specifications is desired, this must be negotiated directly with Telecom. There are no guarantees of success and the actual implementation of the functionality is likely to be costly to the network operator requesting the functionality.
- G.18 An example is BellSouth's request to Telecom to support functionality to allow access to the international signalling system No. 7 network to enable BellSouth to offer GSM automatic international roaming service to its customers. This service is an important differentiator to the services offered by the Telecom mobile network. The requirement to negotiate this functionality was included in the original interconnection agreement between Telecom and BellSouth, with detailed negotiation to be separate from the interconnect negotiations. Even then, the negotiation of a suitable technical solution (with acceptable commercial terms) took almost two years and required a joint briefing chaired by the Ministry of Commerce.
- G.19 Another example of additional functionality which BellSouth attempted to negotiate with Telecom but eventually abandoned was the support of an international length A-number (15 digits). International length A-number is part of the ITU-TS recommendations that Telecom does not support at the interconnection. The A-number is the telephone number of the calling party and is passed from the BellSouth network to the Telecom network to enable BellSouth customers to have access to Telecom services such as operator services. However, Telecom's network does not support international length A-numbers which is necessary in the case of GSM roamers from other countries. Because of this lack of functionality, BellSouth has gone to considerable expense to modify its network to allow roamers from countries onto BellSouth's network. As a consequence, roamers to the BellSouth network cannot access some services, such as the Telecom operator services.
- G.20 Telecom has demonstrated that it is unwilling to negotiate functionality which is not covered by ITU-TS recommendations. This means that support of the interoperability of the more complex services between networks which require interconnection at the higher functional levels is unlikely to proceed in the near term. This will significantly reduce innovation in telecommunication services to the general public in New Zealand.

APPENDIX H

Numbering

Description

- H.1 Numbers are a fundamental requirement for the operation of a telecommunications network. They are used to provide information to both networks and their customers about how to connect a call. Numbers can have embedded within them a variety of information. This can include geographic location, service provider or network operator information, tariffing information, types of service provided, etc.

Importance of numbering to competition

- H.2 When customers subscribe to a network operator or service provider, they are generally assigned a number or set of numbers. For many customers, especially business customers, these numbers become an integral part of their identity and are considered either a tangible or intangible asset.
- H.3 Therefore, the ability of customers to maintain the use of the same number over a long period of time is of paramount importance. This means that the inability that currently exists for customers to retain the same telephone number if they choose to switch service providers or telecommunications networks is a significant barrier to their decision to change.
- H.4 In addition to this, competition can be restricted where a natural monopoly chooses to promote services based on number ranges or patterns that cannot be matched by those networks attempting to compete. For example, Telecom promotes services on its mobile network which are accessed by numbers beginning with *. This is being done in the full knowledge that these services cannot be supported by the BellSouth GSM network, thus creating a barrier to competition because customers may choose not to join a network that they perceive provides "limited" service. This can also serve to confuse customers and can create potentially dangerous situations in the case of services like *555 (Traffic Safety Service).

Current New Zealand environment with respect to numbering

- H.5 Historically, the management and control of the New Zealand national numbering plan has been in the hands of Telecom. While there was no competition in the telecommunications market, there was no conflict between Telecom's role as a number administrator and its role as a supplier of telecommunications services. This is no longer the case. There are now many obvious examples where the conflict that has now emerged is limiting the ability for new entrants into the New Zealand telecommunications market to compete with the dominant incumbent.
- H.6 In order to try and make progress on this important competitive issue, the New Zealand Telecommunications Numbering Advisory Group has been convened and is chaired by the Ministry of Commerce. This group has representation from all the telecommunications network operators and is expected to operate by consensus to

develop a numbering environment that allows fair competition and also, importantly, to meet the current and future needs of customers.

- H.7 Unfortunately, the competitive environment in New Zealand today means that this approach has not worked so far and, indeed, is unlikely to work in the future. Thus, the market dominance of the dominant incumbent is the more easily perpetuated.

Conclusions

- H.8 In order for there to be full competition in the telecommunications market, management and control of the New Zealand national numbering plan must not remain in the hands of one of the competitors, particularly if that competitor already has a dominant position in the market. Instead, it should be administered and controlled by an organisation representing the interests of the telecommunications industry, and of all concerns, as a whole.
- H.9 Furthermore, full portability of numbers between networks must be seen as a precursor to effective competition. Since the implementation of number portability relies on the active co-operation by the dominant incumbent, priority needs to be given to ensuring that an environment exists where that co-operation can be assured.

APPENDIX I

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APPENDIX J

Contributors to BellSouth's Submissions

Professor Nicholas Economides; Stern School of Business, New York University

Alain de Fontenay; de Fontenay, Savin & Kiss

Eric de Fontenay; de Fontenay, Savin & Kiss

Professor David Gabel; City University of New York

Peter Grindley; Law & Economics Consulting Group, Inc.

Michael O'Bryan; Minter Ellison

Michael Pryles; Minter Ellison

Eric Ralph; George Washington University

Brian Savin; de Fontenay, Savin & Kiss

Professor David Teece; University of California at Berkeley, Law & Economics Consulting Group, Inc.

Professor Jean Tirole; Institut d' Economie Industrielle, Université des Sciences Sociales de Toulouse

Professor Glenn Woroch; Haas School of Business, University of California

Paul Zielinski; de Fontenay, Savin & Kiss

APPENDIX K

The New Zealand Herald
28 September 1995
(Section 3, page 5)

PHONE ACCORD DELAYED

Wellington: The formal signing of the Telecom and Clear local service inter-connection agreement is likely to be at the end of October rather than today as previously targeted.

The Clear chief executive, Mr Andrew Makin, said the September 28 completion date targeted when heads of agreement were announced early this month was overly-optimistic.

Mr Makin said the 1000-page contract being worked on by lawyers was a huge document which also embraced other matters, including the toll interconnection agreement which expires at the end of this year.

APPENDIX D